THE PLANT DISEASE REPORTER

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THE PLANT DISEASE SURVEY, DIVISION OF MYCOLOGY AND DISEASE SURVEY
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The Plant Disease Reporter is issued as a service to plant pathologist throughout the United States. It contains reports, summaries, observations and comments submitted voluntarily by qualified observers. The reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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U. S. DEPARTMENT OF AGRICULTURE

CHECK LIST REVISION

Freeman Weiss

ELYMUS (GRAMINEAE)

ELYMUS CONDENSATUS Presl, GIANT WILD-RYE (1). Tall perennial bunch grass of the Western Plains and medium altitudes to the Pacific coast; of considerable forage value when young and as winter feed, sometimes cut for hay. E. TRITICOIDES Buckl., CREEPING WILD-RYE (2), a stoloniferous, turf-forming perennial, more frequent in moist soil and affording better forage, has a similar range. The seed of both spp. was gathered for food by the aborigines.

Ascochyta graminicola Sacc., on leaves. Wash. (1).

Claviceps purpurea (Fr.) Tul., ergot. Widespread (1); Calif., Nev., Oreg., Wash. (2).

Erysiphe graminis DC., powdery mildew. Pacific Northwest, Nev., Wyo. (1); Mich. (2), in nursery plots.

Euryachora aristidae (Schw.) Theiss. & Syd., char spot. Mont., Wyo. (1). See also Septogloeum oxysporum.

Fusarium scirpi C. R. Lambert & Fautr. var. acuminatum (Ell. & Ev.) Wr., secondary root rot. N. Dak. (2).

Helminthosporium sp., leaf spot. Mich.

Heterosporium avenae Oud., on leaves, ? leaf spot. Oreg., Wash. (1).

Mycosphaerella sp., on leaves. Wash. (2).

Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Calif. (1, 2), Wyo. (1).

P. serialis Ell. & Ev., tar spot. Calif. (2).

Phyllosticta sp., leaf spot. Oreg. (1)

Pseudomonas coronafaciens (Elliott) Stapp var. atropurpurea (Reddy & Godkin) Stapp, chocolate spot. Calif., Oreg., Wash. (1).

Puccinia coronata Cda. (II, III), crown rust. Mich. (2)

P. glumarum (Schm.) Eriks. & Henn. (II, III), stripe rust. Calif., Oreg., Wash. (1, 2); Mont. (1).

P. graminis Pers. (II, III), stem rust. Widespread (1); Calif., N. Dak., Wash. (2). The var. tritici Eriks. & Henn. identified on this host in nature.

P. montanensis Ell. (II, III), brown stripe rust. Mont., Nebr., N. Dak., Utah, Wash. (1); Oreg. (2). O and I on Berberis fendleri.

P. pattersoniana Arth. (II, III), rust. N. Mex. (2), Utah (1, 2) O and I on Brodiaea douglasii Wats.

P. procera Diet. & Holw. (II, III), rust. Calif., Oreg., Wash., Wyo. (1). O and I on Ellisia and Phacelia.

P. rubigo-vera (DC.) Wint. (II, III), leaf rust. Widespread (1, 2). The var. agropyri (Eriks.) Arth., with O and I on numerous genera of Ranunculaceae is reported most frequently on both hosts; var. apocrypta (Ell. & Tracy) Arth. with O and I on Boraginaceae and Hydrophyllaceae identified on (1) in Oreg. & Wash.

ELYMUS cont.

Rhynchosporium secalis (Oud.) J. J. Davis, scald. Wash. (1)
Scolecotrichum graminis Fckl., brown stripe. Mont., Wash. (1); Oreg. (2).
Selenophoma donacis (Pass.) Sprague & A. G. Johns., stem speckle. Mont., N. Dak., Oreg., Wash. (1).
Septogloeum oxysporum Bomm., Rouss. & Sacc., char spot. Mont., Utah, Wash., Wyo. (1); Calif. (2). Conidial stage of Euryachora aristidae?
Septoria elymi-europaei Jaap, leaf spot. Calif., Oreg. (2).
S. infuscans (Ell. & Ev.) Sprague, brown leaf blotch. Mont., Oreg., Utah, Wash., Wyo. (1); Calif., Oreg., Wash. (2).
S. pacifica Sprague, on leaves. Calif. (1).
Stagonospora arenaria Sacc., leaf spot. Calif. (2).
Telimena sp., tar spot. Wash. (2).
Urocystis agropyri (Preuss.) Schroet., flag smut. Wash., Wyo. (1). Also reported as U. tritici Koern., to some races of which (2) is susceptible.
Ustilago hypodytes (Schlecht.) Fr., stem smut. Calif., Nev., Oreg., Utah, Wash. (1).
U. macrospora Desm., stripe smut. Mont. (1)

Bends (hairpin disease) -- cause unknown. Wash. (1).

ELYMUS DAHURICUS Turcz., DAHURIAN WILD-RYE (1), E. SALSUGINOSUS Turcz. (2), E. SIBIRICUS L., SIBERIAN W. (3), and E. EXCELSUS Turcz. (4). Asiatic spp. introduced for forage grass trials.
Ascochyta agropyrina (Fairm.) Trott., leaf spot. N. Dak., Wash.
Claviceps purpurea (Fr.) Tul., ergot. Wash. (1, 4). N. Dak. (2).
Epichloë typhina (Pers. ex Fr.) Tul., cat-tail. Wash. (1).
Erysiphe graminis DC., powdery mildew. Mich. (1), N. Dak. (3).
Fusarium spp., secondary root rot. N. Dak. (1, 3). Including the following: F. equiseti (Cda.) Sacc., F. oxysporum Schlecht., F. scirpi C. R. Lambert & Fautr., with its var. acuminatum (Ell. & Ev.) Wr.
Helminthosporium sativum Pam. King & Bakke, root rot. N. Dak. (1, 3, 4).
Pseudomonas coronafaciens (Elliott) Stapp var. atropurpurea (Reddy & Godkin) Stapp, chocolate spot. N. Dak. (3, 4).
Puccinia coronata Cda. (II, III), crown rust. Mich. (1).
P. glumarum (Schm.) Eriks. & Henn. (II, III), stripe rust. Wash. (3, 4).
P. graminis Pers. (II, III), stem rust. Mich., Wash. (1, 3), N. Dak. (+4). The var. tritici Eriks. & Henn. identified in nature.
P. montanensis Ell. (II, III), brown stripe rust. Mich., N. Dak. (3).
P. procera Diet. & Holw. (II, III), rust. Alaska (1).
P. rubigo-vera (DC.) Wint. (II, III), leaf rust. N. Dak., Oreg. (3); Wash. (4).
Scolecotrichum graminis Fckl., brown stripe. Wash. (3).
Ustilago bullata Berk., head smut. Ida., Wash. (3).

ELYMUS cont.

Ustilago hordei Lagh., covered head smut. Wash. (4).
U. hypodytes (Schlecht.) Fr., stem smut. Wash. (1, 3, 4).
U. striaeformis (West.) Niessl, stripe smut. Wash. (3).

Bends -- cause unknown. Wash. (4).

ELYMUS GLAUCUS Buckl., BLUE WILD-RYE (1), and E. CANADENSIS L., CANADA W. Tufted perennials of plains and open woods, the former at medium or low-altitudes in the Western States, sparingly in the Prairies; the latter also throughout the East. Both spp. variable and numerous varieties described; of some forage value when young, especially 1.

Anguina sp. (reported as Tylenchus sp.), floret and seed gall. ? Oreg., ? Alaska.
Ascochyta agropyrina (Fairm.) Trott., on leaves. N. Dak. (2).
A. elymi Tehon & Daniels, leaf blight. N. Dak. (2).
Claviceps purpurea (Fr.) Tul., ergot. Widespread (1, 2).
Epichloë typhina (Pers. ex Fr.) Tul., cat-tail. Minn., Wash. (2).
Erysiphe graminis DC., powdery mildew. Mich., Minn., Mont., Pa., Wis. (2); Wash. (1, 2).
Fusarium spp., secondary root rot. N. Dak. (2). Including F. equiseti (Cda.) Sacc., F. oxysporum Schlecht. emend. Snyder & Hansen, and F. scirpi C. R. Lambert & Fautr. var. acuminatum (Ell. & Ev.) Wr.
F. avenaceum (Fr.) Sacc., parasitic on rust. Oreg. (1).
F. nivale (Fr.) Sacc., snow mold. Wash. (1).
Helminthosporium sativum Pam. King & Bakke, root rot. Minn., N. Dak. (1, 2).
H. tritici - repentis Died., leaf spot. Wash. (1). Conidial stage of Pyrenophora tritici-repentis (Died.) Drechs.
Hendersonia culmicola Sacc. var. minor Sacc., on leaves and stem. Pa., Tex. (2).
Leptosphaeria culmorum Auers., on culms. Calif. (1), N. Dak. (2).
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Calif., Mont., N. Y. (1); widespread (2).
Phyllactinea corylea Pers. ex Karst., powdery mildew. Oreg. (1). Reported by R. Sprague as "firmly attached to the host".
Piricularia parasitica Ell. & Ev., leaf spot. Wis. (2).
Pseudomonas coronafaciens (Elliott) Stapp var. atropurpurea (Reddy & Godkin) Stapp, chocolate spot. N. & S. Dak. (2).
Puccinia coronata Cda. (II, III), crown rust. Mich. (2).
P. glumarum (Schm.) Eriks. & Henn. (II, III), stripe rust. Calif., Ida., Oreg., Utah, Wash., Wyo. (1); Mont., Wash. (2).
P. graminis Pers. (II, III), stem rust. Widespread (1, 2). Vars. secalis Eriks. & Henn. and tritici Eriks. & Henn. identified.
P. montanensis Ell. (II, III), brown stripe rust. N. Dak. to Colo. and Wash. (1); Mich. to N. Mex. & Wash. (2).
P. rubigo-vera (DC.) Wint. (II, III), leaf rust. Widespread (1, 2), especially the vars. agropyri (Eriks.) Arth., apocryta Ell. & Tracy, and impatientis (Arth.) Mains; also a number of other vars. erected by Mains.

ELYMUS cont.

Pythium arrhenomanes Drechs., root browning. N. Dak. (1).
Rhizoctonia solani Kuehn, secondary root rot, sheath rot. N. Dak. (2), Oreg. (1).
Rhynchosporium orthosporum Caldwell, scald. Oreg. (1).
R. secalis (Oud.) J. J. Davis, scald. Oreg. (1); Wash. (1, 2).
Scolecotrichum graminis Fckl., brown stripe. N. Y. to Calif. and Wash. (1, 2).
Selenophoma donacis (Pass.) Sprague & Johns., stem speckle. Oreg., Wash. (1).
Septogloeum oxysporum Bomm. Rouss. & Sacc., char spot. Calif., Oreg., Wash. (1).
Septoria agropyri Ell. & Ev., leaf spot. Oreg., Wash. (1).
S. elymi Ell. & Ev. leaf spot. Mich., Oreg., Wash. (1); Iowa, N. & S. Dak., Wis. (2).
S. infuscans (Ell. & Ev.) Sprague, brown leaf blotch. Oreg., Wash. (1); N. & S. Dak., Wash. (2).
Sphaerulina divergens Rehm, on stems. N. Dak. (2).
Stagonospora arenaria Sacc., leaf spot. Oreg., Wash. (1); Ky., Mich., Wis. (2).
Tilletia sp., bunt. Mont. (2).
T. elymi Diet. & Holw., bunt. Colo., Mont., Oreg., Wyo. (1).
Urocystis agropyri (Preuss.) Schroet., flag smut. Utah, Wash. (1); Wis., Ind. and Miss. to N. Mex. and Utah (2). Also reported as U. occulta (Wallr.) Rabh. and U. tritici Koern. to some races of which both host spp. are susceptible.
Ustilago bullata Berk., loose head smut. Mich. (2), Wash. (1, 2).
U. hordei (Pers.) Lagh., covered head smut. Wash. (1, 2).
U. hypodytes (Schlecht.) Fr., stem smut. Calif., Wash. (1); Iowa, Minn., Oreg., Wash. (2).
U. macrospora Desm., stripe smut. Mont., Utah, Wash. (2).
U. striaeformis (West.) Niessl, stripe smut. Oreg., Utah, Wash. (1); Iowa, Minn., Mo., Nebr., Tex., Utah, Wash., Wis., (2). This race or var. has been designated U. s. forma hordei G. W. Fisch. in the Pacific Northwest; U. elymicola Syd. in N. Dak. may be the same.
U. sitanii G. W. Fisch., loose smut. Wash.

Bends (hairpin disease) -- cause unknown. Wash. (1, 2).

ELYMUS MOLLIS Trin., AMERICAN DUNEGRASS, DUNE WILD-RYE. Creeping perennial of sandy coasts in the North Atlantic, North Pacific, and Great Lakes States; of value as a soil binder and as food for wildlife.

Claviceps purpurea (Fr.) Tul., ergot. Oreg., Alaska
Heterodera marioni (Cornu) Goodey, root knot. Wash.
Puccinia procera Diet. & Holw. (II, III), rust. Calif.
P. rubigo-vera (DC.) Wint. (II, III), leaf rust. Calif., Oreg., Wash. Alaska.

ELYMUS cont.

Scolecotrichum graminis Fckl., brown stripe. Alaska.
Septoria pacifica Sprague, black stripe. Oreg.
Stagonospora arenaria Sacc., leaf spot. Alaska.
S. subseriata (Desm.) Sprague, leaf spot. Oreg.
Tiarospora perforans (Rob. ex Desm.) Hoehn., leaf speckle. Oreg.

ELYMUS VIRGINICUS L., SOUTHERN WILD-RYE. Tuft-forming perennial of moist lowland habitats occurring throughout the Eastern and Central States to the Gulf of Mexico and Pacific Northwest; furnishes food for wildlife.

Ascochyta agropyrina (Fairm.) Trott., leaf spot. N. Dak.
A. elymi Tehon & Daniels. Ill.
A. graminicola Sacc. Tex.
Claviceps purpurea (Fr.) Tul., ergot. Widespread.
Epichloë typhina (Pers. ex Fr.) Tul., cat-tail. Minn., N. & S. Dak., Okla., Wash.
Erysiphe graminis DC., powdery mildew. Minn.
Helminthosporium giganteum Heald & Wolf, zonate eye spot. Md., Pa., Wash.
H. sativum Pam. King & Bakke, root rot. Minn., N. Dak.; spot-blotch, Va.
Phyllachora graminis (Pers. ex Fr.), tar spot. General.
Piricularia parasitica Ell. & Ev., leaf spot. Wis.
Pseudomonas coronafaciens (Elliott) Stapp var. atropurpurea (Reddy & Godkin) Stapp, chocolate spot. Mont., N. Dak., Wash.
Puccinia coronata Cda. (II, III), crown rust. Mich.
P. glumarum (Schm.) Eriks. & Henn. (II, III), stripe rust. Ida., Wash.
P. graminis Pers. (II, III), stem rust. Ind., Mich., Minn., S. Dak., Wis. Vars. secalis, tritici and phlei-pratensis identified.
P. montanensis Ell. (II, III), brown stripe rust. W. Va. to Ky., Tex. and S. Dak.
P. rubigo-vera (DC.) Wint. (II, III), leaf rust. General. Vars. agropyri and impatientis frequent; numerous other vars. also described.
Scolecotrichum graminis Fckl., brown stripe. Kans.
Septoria sp., leaf spot. Miss., Wis.
Stagonospora arenaria Sacc., leaf spot. Mich.
Urocystis agropyri (Preuss.) Schroet., flag smut. Ill., Kans., Mo., Wis.
Ustilago hypodytes (Schlecht.) Fr., stem smut. Mont.
U. striaeformis (West.) Niessl, stripe smut. Ill., Ind., Iowa, Kans.

ERAGROSTIS (GRAMINEAE)

ERAGROSTIS spp. Annual or perennial grasses of great diversity, mostly in waste ground. Some, as E. CILIANENSIS (All.) Link, and E. POAEOIDES (L.) Beauv., are cosmopolitan weeds; several, as E. HYPNOIDES (Lam.) B. S. P. and E. GLOMERATA (Walt.) L. H. Dewey,

ERAGROSTIS cont.

furnish food for wildlife; E. INTERMEDIA Hitchc. is of limited forage value in the southern Plains; E. CURVULA (Schrad.) Nees has been tested as a forage grass.

Curvularia geniculata (Tracy & Earle) Boed., on glumes. Iowa, Miss.
Dothichloë limitata Diehl, black crust, sterility disease. On E. capillaris (L.) Nees, E. hirsuta (Michx.) Nees, and E. refracta (Muhl.) Scribn. Va. to Fla. and Ala.
Fusarium scirpi C. R. Lambert & Fautr. var. acuminatum (Ell. & Ev.) Wr., secondary root rot. On E. curvula. N. Dak.
Helminthosporium giganteum Heald & Wolf, zonate eye spot. On E. cilianensis and E. pectinacea (Michx.) Nees. Md., Va.
H. hadotrichoides Ell. & Ev., on leaves of E. cilianensis. Del., Mont.
H. leucostylum Drechs., leaf spot. On E. cilianensis. Del., Md., Va.
H. ravenelii Curt., on glumes of E. pilosa (L.) Beauv. Miss.
H. rostratum Drechs., leaf spot. On E. cilianensis. Iowa, Ky., Md., Va.
H. sativum Pam. King & Bakke, root rot. On E. curvula and E. pilosa. N. Dak.
Heterodera marioni (Cornu) Goodey, root knot. On E. diffusa Buckl., Calif.
Phoma terrestris Hansen, secondary root rot. On E. pilosa, N. Dak.
Phyllachora eragrostidis Chardon, tar spot. On E. capillaris, E. hirsuta and other spp. in Ala., Ga., Nebr., N. Mex., Tex.
Rhizoctonia solani Kuehn, secondary root rot. On E. curvula, N.Dak.
Sphacelotheca strangulans (Issat.) Clint., inflorescence smut. On E. diffusa and E. neomexicana Vasey in Ariz.
Tilletia eragrostidis Clint. & Ricker, covered smut. On E. glomerata, Miss.
Uromyces eragrostidis Tracy (II, III), rust. On E. capillaris, E. pectinacea and others from N. J. to Ala., Ariz., and Nebr.; P. R. O and I unknown.
Ustilago spermophora Berk. & Curt., seed smut. On E. cilianensis, from Mass. to S. Car., La. and S. Dak., occasional on E. hypnoides, E. poaeoides and others in this range.

Bends -- cause unknown. On E. lugens Nees, Wash.

EREMOCHLOA (GRAMINEAE)

EREMOCHLOA OPHIUROIDES (Munro) Hack., CENTIPEDE GRASS. Creeping perennial of southeastern Asia, introduced as a lawn grass in the South.

Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. Fla.
Curvularia sp., on leaves. La.

ERIANTHUS (GRAMINEAE)

ERIANTHUS ALOPECUROIDES (L.) Ell., SILVER PLUMEGRASS (1). Tall perennial of open woods and waste ground from N. J. to Ind., Fla. and Texas. E. GIGANTEUS (Walt.) Muhl., SUGAR-CANE P. (2); and other ERIANTHUS spp. (3); grasses of similar habit and mostly southern range. The first is grown as an annual for ornament.

Apiospora montagnei Sacc., on culms. Ga. (3).
Cerebella andropogonis Ces., on ergot-infected inflorescences. Ala. (3).
Cladosporium erianthi Thuem., on glumes & leaves. S. Car. (1).
Claviceps purpurea (Fr.) Tul., ergot. Ala. (3), Okla. (1).
Curvularia sp., on leaves. Fla. (3).
Helminthosporium sp., leaf spot. Fla. (3).
Hendersonia donacis Sacc. and H. erianthi Atk., on dead stems. Ala.
Leptosphaeria orthogramma (Berk. & Curt.) Sacc., on culms. Ala. (1), Ga. (3).
Phyllachora erianthi Orton, tar spot. Ala. (2), Fla. (1, 2, 3), Ga. (3), S. Car. (1).
Puccinia virgata Ell. & Ev. (II, III), rust. Ga. (3). O and I unknown.
P. polysora Underw. (II, III), rust. Fla. (1). O and I unknown.

ERIOCHLOA (GRAMINEAE)

ERIOCHLOA POLYSTACHYA H.B.K, CARIB GRASS (1). Perennial of the West Indies, introduced in the Gulf States, valuable for forage and hay. ERIOCHLOA SPP. (2). Several spp. of moist habitats in the southern Prairies and Plains, furnishing food for wild life.

Ephelis japonica P. Henn., black head. P. R. (1). Conidial stage of a Balansia.
Helminthosporium sp., leaf spot. Fla. (1).
Nigrospora oryzae (Berk. & Br.) Petch, secondary leaf spot. P. R. (1).
Phyllachora eriochloae Speg., tar spot. P. R. (1). Also on E. punctata (L.) Desv. P. R.
Sorosporium eriochloae Griff., seed smut. Ariz., Calif. (2). On E. gracilis (Fourn.) Hitchc. and E. punctata.
Sphaerodothis luquillensis Chardon, black leaf spot. P. R. On E. punctata.
Uromyces leptodermus Syd. (II, III), rust. P. R. (1). O and I unknown.

ERIOPHORUM (CYPERACEAE)

ERIOPHORUM spp., COTTON-GRASS.

Epichloë hypoxylon Auth., black ring. Pa. A Dothichloë from the description but none known on this host genus.
Puccinia angustata Pk. (II, III), rust. Me. to Nebr. and Creg. O and I on Lamiaceae. The var. eriophori (Thuem.) Arth. of similar range, but typically more northern, and with O and I on Compositae, is not distinguishable on its Eriophorum hosts.
Septoria chamissonis Sacc. & Scalia, leaf spot. Alaska.
S. eriophorella Sacc. & Scalia, and S. eriophori Oud. on leaves. Alaska.

EUCHLAENA (GRAMINEAE)

EUCHLAENA MEXICANA Schrad., TEOSINTE. Tall annual of Mexico, resembling maize, occasionally cultivated in the South for forage.

Bacterium stewartii E. F. Sm., bacterial blight. Md.
Helminthosporium turcicum Pass., leaf blight. Tex.
Physoderma zeae-maydis Schw., brown spot. Fla., La., S. Car.
Puccinia sorghi Schw. (II, III), rust. Conn., Iowa, Nebr. O and I on Oxalis spp.
Ustilago maydis (DC.) Cda., smut. Conn. to Ala., Kans., & Wis.

DIVISION OF MYCOLOGY AND DISEASE SURVEY

PRE-EMERGENCE DAMPING-OFF CONTROL IN GUAYULE WITH PHENYL MERCURIC FUNGICIDES

Bailey Sleeth

Promising results in the control of pre-emergence damping-off of guayule (Parthenium argentatum Gray) were obtained in greenhouse tests with certain phenyl mercuric fungicides (table 1)[1]. Three dosage levels of each fungicide or preparation were used on threshed guayule seed (achenes). The fungicidal dosage ranged from 0.1% to 1.0% based on weight of seed treated. The fungicides were applied as a dust and a uniform distribution on the seed was secured by shaking the two together in a closed glass container. In the experiment herein reported the treated lots of seed and check were planted in 5 randomized replications of 100 seeds each in soil known to be infested rather heavily with Pythium ultimum Trow. The seed was sown in rows and covered with 1/8 to 1/4 inch of pasteurized sand. The flats were watered lightly several times a day to keep the soil surface moist in order to get quick emergence.

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[1] The fungicides were supplied through the courtesy of the F. W. Berk & Co., New York, N. Y.

Approximately 25% of the total seedlings had emerged by the 5th day after sowing and emergence was nearly completed by the 10th day. The total emergence in table 1 is given as the number of seedlings that had emerged by the 15th day following sowing. Post-emergence losses were small, they were less than 5% of the total emerged seedlings.

Table 1. Emergence of guayule seed treated with phenyl mercuric fungicides.

Fungicidal treatment	Dosage	Seedling[a] emergence
	Per cent	Per cent
Phenyl mercuric salicylate (Mersolite 19)	0.1	85.0
Phenyl mercuric salicylate (Mersolite 19)	0.2	86.0
Phenyl mercuric salicylate (Mersolite 19)	0.3	81.2
Phenyl mercuric acetate (Mersolite 8)	0.1	82.6
Phenyl mercuric acetate (Mersolite 8)	0.3	80.2
Phenyl mercuric acetate (Mersolite 8)	0.5	82.4
4% phenyl mercuric acetate in diatomaceous earth	0.25	6.2
4% phenyl mercuric acetate in diatomaceous earth	0.50	4.6
4% phenyl mercuric acetate in diatomaceous earth	1.00	13.6
2% phenyl mercuric acetate in bentonite clay	0.25	4.0
2% phenyl mercuric acetate in bentonite clay	0.50	8.2
2% phenyl mercuric acetate in bentonite clay	1.00	14.5
4% phenyl mercuric chloride (Mersolite 2) in bentonite clay	0.25	10.4
4% phenyl mercuric chloride (Mersolite 2) in bentonite clay	0.50	41.8
4% phenyl mercuric chloride (Mersolite 2) in bentonite clay	1.00	67.2
Check (Untreated seed)	0.0	3.2
Difference required for significance, 5% level		7.66

[a] Seedling emergence is based upon the total number of seedlings which emerged within 15 days after sowing.

The emergence of 80 to 86% of the seed treated with the different dosages of phenyl mercuric salicylate and phenyl mercuric acetate represents 95 to 98% emergence of the germinative seed sown. These two fungicides in the three dosages used gave significantly better emergence than the other treatments including check. A measure of the pre-emergence protection given by these fungicides is indicated by the low emergence of 3.2% in the check. It seems likely that the actual quantity of phenyl mercuric salicylate and phenyl mercuric acetate needed to give pre-emergence damping-off control may be lower than the 0.1% dosage and might be secured by using a suitable diluent and carrier.

SPECIAL GUAYULE RESEARCH PROJECT
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

NONINFECTIOUS MOSAIC PATTERN OF TOMATO

John T. Middleton

On several occasions tomato material has been received from Orange County that was belived to have been affected with common tobacco mosaic virus. Leaves of this material were mottled, somewhat distorted, and slightly cupped; the most conspicuous symptom was the yellow-green mosaic pattern. The disease was tentatively identified as tomato mosaic. Additional samples were received and juice inoculations made on cucumber, tobacco, and tomato. No infection was obtained. Repeated inoculations yielded negative results.

Field observations revealed an interesting fact, namely that mosaic pattern symptoms seemed to be confined to certain clearly defined areas. Upon questioning the grower, it was ascertained that sodium chlorate had been applied to the area in question some time in the past in an effort to control bindweed, Convolvulus arvensis. Other fields in the vicinity were observed where sodium chlorate was known to have been applied. Tomatoes grown on land so treated displayed leaf symptoms that usually would have been attributed to tobacco mosaic virus on tomato. The more recent the soil treatment the more conspicuous the symptoms. Sodium chlorate treatments applied the previous growing season adversely affected the growth of tomatoes; plants were usually stunted, and yellow, with the leaves markedly mottled and distorted. The few fruits seen were small but not malformed. As the interval between sodium chlorate application and tomato culture increased the symptoms on tomato became progressively less conspicuous. Mosaic pattern symptoms were present on tomatoes grown on land which had been treated with sodium chlorate five years earlier. No fields with longer interval of chlorate treatment and tomato culture were available for observation.

DIVISION OF PLANT PATHOLOGY, CALIFORNIA AGRICULTURAL EXPERIMENT STATION, RIVERSIDE

THE SEASONAL SPREAD AND DEVELOPMENT OF CURCURBIT DOWNY MILDEW IN ATLANTIC COASTAL STATES IN 1944

C. J. Nusbaum

In recent years several workers in states along the Atlantic coast from Florida to Massachusetts have collaborated in reporting the time of appearance and development of curcurbit downy mildew (Pseudoperonospora cubensis) in their respective localities. This has been done in order to gain evidence of seasonal, northward migration of the fungus by means of windborne spores with the view of organizing a downy mildew "warning" service. If the northward journey from frost-free areas in Florida could be followed and the time of its arrival in any commercial producing area anticipated, it would be beneficial in regulating the application of protective fungicides upon susceptible curcurbits. Information[1] previously

[1] Nusbaum, C. J. The seasonal spread and development of curcurbit downy mildew in Atlantic coastal States. Plant Disease Reporter, 28 (3): 82-85, 1944.

assembled indicates that a downy mildew reporting service might prove to be useful. This program, being based upon an accumulation of circumstantial evidence, is still speculative and an appraisal of its true worth may await study of several seasons' results. A summary of the 1944 reports follows:

Florida. In Manatee County and other areas in central and southern Florida, downy mildew developed on fall cucurbits and was observed throughout the winter months. Losses were from moderate to severe. The disease was particularly destructive in this region on the spring crop. Although rainfall was light in April and early May, heavy dews favored sporulation and consistent spread. Many fields of cucumbers, which were not sprayed, were a total loss. In the Gainesville area, downy mildew developed abundantly on cucumbers, cantaloupes, and squash in May and it also caused considerable damage on watermelons. -- A. L. Harrison and G. F. Weber.

Georgia. Downy mildew was not observed in the Tifton section. Unseasonably high temperatures and drouth conditions occurred throughout late May and June and the crop of cucumbers was generally poor. -- W. D. Moore

South Carolina (Charleston). Downy mildew was first observed on cucumbers on May 31, on about the same date that it was first found in 1943. The lesions were obviously from secondary infections. Primary infection probably took place during the favorable period of May 17 to 20, although an earlier wet spell of May 5 and 6 might have been involved. The disease spread rapidly during the first week of June and caused about 50% defoliation in some fields by June 8. The peak of infection was reached in mid-June and nearly all cucumber fields were severely defoliated by June 20. A good crop was harvested in fields other than those in which infection appeared early. -- C. N. Clayton.

South Carolina (Blackville). Downy mildew was first found on cucumbers on June 10, at about the usual time. On that date, only a few scattered, young lesions were found in one out of 8 fields examined, indicating primary infection of recent origin. Favorable conditions for infection occurred from May 17 to 20, from May 23 to 26, and from June 4 to 8. Conditions were very unfavorable from May 27 to June 3, because there were no rains or dews and temperatures were very high during that period. Primary infection probably took place between June 4 and 8 for, if the two earlier favorable periods were involved, infection would have been more abundant by June 10. The inference, therefore, is that inoculum was not present in the vicinity of Blackville prior to May 27.

A severe drouth with high temperatures occurred in the Blackville area from June 12 to 20 and downy mildew failed to develop until the advent of cooler, moist weather late in June. Cucumbers escaped damage. The disease reached a destructive level on cantaloupes by July 8, when harvest was nearly over. -- C. J. Nusbaum

North Carolina. Downy mildew was first found in a single cucumber field in the Laurinburg area on June 27, a few days earlier than in 1943. An extreme drouth in mid-June was broken June 18, although high temperatures generally prevailed throughout the remainder of the month and rain fell only in scattered showers. Cool, moist weather favored sporulation

and spread of downy mildew early in July. Cucumbers escaped damage. The disease did not develop on cantaloupes until the harvest had passed its peak. -- D. E. Ellis

Virginia. Downy mildew first appeared on cantaloupes in the Tidewater area during the first week in August, although it may have been present a little earlier. The weather was very dry during cucumber harvest which ended in mid-July. The disease did not appear on this crop. Downy mildew was of little consequence on cantaloupes because harvest was nearly over before foliage infection became severe. Watermelons became infected late in August but harvest was past its peak and very little damage resulted. --G. K. Parris

Delaware. Several inspections in the principal cucurbit growing areas were made in July and August. No downy mildew infection was found. The weather during the entire season was hot and dry and there was little opportunity for establishment of the disease. -- J. W. Heuberger

Pennsylvania. The growing season for cucurbits at Doylestown was hot and dry. Downy mildew was not observed. -- R. P. Porter

New York (Long Island). On August 9, 5 abandoned pickle fields in Easthampton were examined. One of them was heavily infected with downy mildew and the others were mildew-free. The infected field was the latest planted one of the lot, picking had been recently completed and the vines were still in full foliage. Downy mildew was probably established in this field in late July but this is entirely speculative. -- O. C. Boyd

Massachusetts. No downy mildew was found on cucurbits either in Plymouth, Hampton and Bristol Counties or the Connecticut River Valley during July and August surveys. However, potato late blight was found in the Connecticut River Valley early in August. This suggests that conditions for infection might have been favorable and that downy mildew was not established because of the absence of inoculum. -- O. C. Boyd.

In general, 1944 was not a favorable year for the development of cucurbit downy mildew in States along the Atlantic coast. It was destructive in Florida and at Charleston, South Carolina. It appeared elsewhere in the Carolinas and Virginia, where it was either delayed or checked by local weather conditions. States to the north of Virginia were virtually mildew-free. The appearance of mildew in a single field of cucumbers on Long Island, the only known occurrence of the disease north of Virginia, raises a question as to the origin of this infection. Obviously this cannot be settled by the information available. However, it does appear that, if the fungus overwintered locally, one might expect to find infection more generally distributed throughout the area.

The writer wishes to thank those who cooperated in this project in 1944 and offers to assemble and distribute the reports again in 1945.

EDISTO EXPERIMENT STATION, BLACKVILLE, SOUTH CAROLINA

BEAN DISEASES IN SOME OF THE INTERMOUNTAIN STATES IN 1944

W. J. Zaumeyer

The writer has issued a number of reports in previous years on the diseases of bean (Phaseolus vulgaris) in western United States. Certain members of the Emergency Plant Disease Prevention Project have recorded the occurrence of bean diseases in the States included in this survey and these briefer reports have been published in various numbers of the Plant Disease Reporter from July to October of 1944, but no comprehensive report has been presented. Furthermore, some of the information here recorded is from sections of the several States not reported upon heretobefore. It is the purpose of this report to record the presence or absence of the several diseases in most of the large bean producing areas of the Intermountain region during the summer of 1944.

This survey was made in conjunction with the inspection of bean seed crops being grown under contract with the War Food Administration. Bean crops of Colorado, Wyoming, Montana, and Idaho were surveyed during parts of July, August, and September. Approximately 180 fields of garden (snap) beans comprising about 2,500 acres and about 150 fields of field (dry shell) beans comprising about 6,000 acres were examined. Although these constitute only a small portion of the acreage represented in the several States, it is felt that representative fields were surveyed and that they reflect disease conditions in general throughout the different sections.

COLORADO

WELD COUNTY. The bean acreage for seed production in this county was about equal to that of 1943, being approximately 130,000 acres. Of this, about 5,000 acres were of the garden types and the rest were Pinto, a field bean variety. About half of the Pintos in the County are grown under dry-land conditions and the others under irrigation. All of the garden beans are grown under irrigation.

Bacterial blights (Xanthomonas phaseoli and Pseudomonas medicaginis var. phaseolicola). From the standpoint of total acreage, these two diseases in general were of minor importance. The Pinto acreage was fairly free from blight whereas certain fields planted with locally produced seed of the garden varieties were very seriously infected with "halo" blight. In a few instances almost a total loss resulted. The acreage planted with such seed was small. Where seed that had been produced in blight-free areas was used, very little if any infection was noted. Most of the acreage was planted with such seed.

Conditions during the early part of the growing season were ideal for the spread and development of the two blight organisms and when primary infection was present, the secondary spread of the organism was usually rapid. Conditions later in the season were not ideal for the development of the organisms and in a few cases where a trace of the disease was noted early, the infection was difficult to observe toward the end of the season.

Rust (Uromyces phaseoli var. typica). Bean rust made its first appearance the middle of July and by early August it was very widespread, being found in varying amounts in practically all fields of Pinto. The

disease was not observed in garden-bean plantings since most of these varieties are resistant or highly tolerant to many of the races of the organism. Where fields were dusted with a fungicide, such as sulfur, before much rust was noted, excellent control resulted. Where dusting was done after the organism became widespread, 2 to 3 applications were necessary to control the disease effectively. Many untreated fields suffered severe losses. In August, the temperature for approximately the first 3 weeks was above normal (+2.3° F for the entire month) and the precipitation was below normal (-0.69 inch) with a total of only 0.42 inch, of which 0.30 inch fell in one day toward the latter part of the month. These conditions prevented considerable development of the organism toward the end of the season. In 1943 the spread was greatest at this time of the year. The disease was not observed in the dry-land acreage.

Sclerotinia wilt (Sclerotinia sclerotiorum). This disease was found in only one field where it killed about 10% of the plants. This is the first time the disease has been reported on beans in the State. The infested field had been cropped with beans for a number of years. Where the disease originated is unknown. Most of the bean seed planted in northeastern Colorado originated in Idaho and Wyoming where Sclerotinia wilt has been reported for the past two years.

Root rots (Fusarium solani f. phaseoli and Rhizoctonia sp). These diseases were again of minor importance and were causing no reduction in yield.

Anthracnose (Colletotrichum lindemuthianum). This disease was not observed in any of the fields examined.

Virus Diseases. Mosaic (bean virus 1) was very common in the Pinto acreage, especially in plantings of the Idaho strain of Pinto. Some fields had as many as 50% of infected plants. There was less mosaic in the Wyoming strain. In the garden-bean varieties the disease was of minor importance. When the regular Stringless Green Refugee variety was grown extensively in the county, mosaic was usually widespread in this variety, but since the introduction of the mosaic-resistant Refugee types the disease has been of little significance in the garden varieties.

Red node (virus) was not observed to any important extent although traces were found in many plantings.

Physiological Diseases. About the middle of August a condition slightly resembling alkali injury was noted in many of the Pinto bean plantings of the irrigated sections of Weld County. Curiously, it was not observed in the garden-bean acreages that were located in the same general vicinity. This condition had never been observed previously in the county although a similar abnormality was observed in Mesa County in 1943 (PDR 28, 1). The plants appeared normal until they were in full pod at which time the leaves became chlorotic and necrotic. This condition became quite general over the field in just a few days. The plants ripened prematurely, with the loss of leaves. This trouble was diagnosed as a slight alkali injury brought about by excessively high temperatures and an insufficient supply of moisture at a time the plants were highly active physiologically. Although there was a normal moisture supply, the plants at this stage of growth apparently needed an abnormal supply because of excessive transpiration during the three weeks of very high temperatures.

As a result, the concentration of salts became slightly too high for the plants to withstand. Frequently, at the ends of the fields where the irrigation water did not drain off readily the plants did not show this injury, because of a greater supply of moisture. It is estimated that in fields where this premature ripening was observed it caused a loss of from 5 to 7 bushels of seed per acre.

MONTEZUMA, LA PLATA, AND DOLORES COUNTIES. The acreage in these counties was made up almost exclusively of the old native Colorado Pinto and consisted of approximately 80,000 acres. Ninety percent of the acreage is grown under dry-land conditions.

Bacterial blights. Neither of the two diseases were observed.

Rust and anthracnose. These diseases were not found in the acreage examined.

Root rots. These diseases were of very minor importance and were causing very little reduction in yield.

Mosaic. A trace of bean virus 1 was noted in Montezuma and Dolores Counties. In La Plata County it was slightly more widespread. Mosaic-infected plants under these growing conditions, are extremely dwarfed with the production of very few pods. It thus appears that the disease tends to eliminate itself under these conditions, by preventing formation of seeds by which it can be transmitted.

WYOMING

The survey in Wyoming was conducted in Washakie, Big Horn, and Park Counties where garden and field beans are grown in considerable acreage.

Bacterial blights. "Halo" blight was especially widespread in Big Horn County in the vicinity of Shell Creek. In fields of garden varieties where locally-grown seed was used for planting, the disease was particularly serious and in some cases entire fields were plowed under. Where southern Idaho seed was used, frequently considerable blight was noted in certain fields, whereas in others it was of minor importance. In the vicinity of Greybull on the Emblem Bench the disease was less serious although it was quite widespread; it was also noted to a considerable extent near Powell. In the Worland section, although the disease was widespread in a number of fields examined, it did not appear to be as serious as it was in the above-mentioned sections. The field-bean varieties, Great Northern and Pinto, were comparatively free from the disease although a few fields showed some common blight (X. phaseoli) infection.

In 1943 these two bacterial diseases were of very minor importance and most of the acreage surveyed then was reported as free of infection. It is believed that this difference in amount of infection between 1943 and 1944 can be accounted for by the weather conditions. During the month of June 1943, the average precipitation for the State was 1.95 inches which was 0.31 inch above the mean for the past 52 years. The average monthly temperature was 1.6° F below the mean. In June 1944, the average precipitation was 3.41 inches, which was the highest June average on record, more than double the normal for the State. July is also a very critical month for the spread and development of the blight organisms. The average

precipitation for the State for July 1943 was 0.71 inch which was 0.62 inch below the long-time mean, and the average monthly temperature was 1.5° above the mean. In 1944, the average precipitation for July was 1.43 inches which is 0.10 inch above the mean and 0.72 inch above 1943. The average monthly temperature for the State was 1.7° below the mean.

Rust. Bean rust was quite common in plantings of the Great Northern and Pinto varieties. Some fields in the Powell district showed almost 100% of the plants infected. A few garden-bean varieties were infected but most of them are quite tolerant to infection.

Sclerotinia wilt was more widespread than in 1943. It was not noted in any of the garden-bean acreage that was surveyed, but only in the field-bean varieties. Since these varieties are viney, a matting of the rows usually occurs fairly early in the season. With frequent irrigation, the humidity near the soil may become fairly high in such fields, thus favoring the development of the organism.

Anthracnose. None was found in the acreage examined.

Virus Diseases. Common bean mosaic was not widespread and was not causing any appreciable yield reduction. The red node disease (virus) was of very minor importance.

MONTANA

In Montana the survey was made in Carbon and Yellowstone Counties where most of the beans in the State are grown.

Bacterial blights. As in Wyoming these diseases were very widespread and serious, causing considerable damage to the crop. Common blight (Xanthomonas phaseoli) was noted in most of the Great Northern acreage, but very little "halo" blight was found. The latter disease was widespread in the plantings of garden varieties, in which not a great deal of common blight was observed. Most of the Great Northern acreage was planted with locally-grown seed. In 1943 neither of the bacterial blights was of any consequence in the State; in fact, the diseases caused by them were difficult to find. In the garden-bean acreages where the seed used was of southern Idaho origin, "halo" blight in some cases was causing much damage, but some fields were free from infection.

Although it is possible that a small amount of seed-borne infection was present in locally-grown seed, it is difficult to ascertain how such widespread dissemination could have resulted from this source alone.

The environmental conditions during June, July, and August of 1944 were ideal for the spread and development of these organisms. In June the rainfall in the Billings section was 7.64 inches as compared with 3.28 inches in 1943 which was then the wettest June since 1895 for the State as a whole. The departure from the normal for Billings was +6.52 inches. The temperature departure from normal was -5.6° F in 1944 and -3.3° in 1943. There were two hailstorms during the month, while in the same month of 1943 there was one. In July 1944 the rainfall was 1.29 inches, which was 0.79 inch more than 1943. There was a departure of -2.6° from the normal in 1944 and of +2.8° in 1943. One hailstorm was reported for the district, the same as for July 1943. In August 1944 the total rainfall was 0.97 inch while in the same month of 1943 it was .82 or a -0.14 inch

departure from the normal. The departure from the normal in temperature for 1943 was +0.1° for August 1943 and -2.5° for the same month in 1944. Two hailstorms were reported in August 1944 and none in August 1943.

Rust was more widespread this year than in 1943, but was only noted in the field-bean acreage. In 1944 it made its appearance much earlier than in the preceding year; and with the carry-over of teliospores from 1943 and the ideal weather for spread and development of the fungus early in the season, the disease became widespread by the middle of August.

Sclerotinia wilt. Sclerotinia wilt was again noted this past summer, as in 1943, causing considerable damage in certain fields of Great Northern beans. Infected plants showed the typical wilting caused by the fungus and sclerotia were found on the stems and pods. It was in this same section of the State that the writer noted the disease in 1930, which is believed to have been the first report of it on beans in the Intermountain States.

Anthracnose. Anthracnose was not found in any of the plantings examined.

Root rots. These diseases were of no consequence in the fields examined. They were found affecting plants in many plantings, but were not causing a reduction in stand or yield in the acreage examined.

Mosaic. The mosaic diseases did not appear to be as common and widespread in 1944 as they were in 1943. Common mosaic (bean virus 1) was not observed in many fields of the Great Northern, since much of the acreage is planted with mosaic-resistant strains. Red node was much less common than in 1943.

IDAHO

The survey in Idaho was made mainly in Twin Falls and Jerome Counties, but some acreage was examined in Minidoka County.

Bacterial blights. While traces of "halo" blight have been observed by the writer in former years in the Twin Falls section, two fields were noted in 1944 that showed more infection than any heretofore observed. The seed planted was reported not to have been of Idaho origin. The amount of infection in these two fields was serious. Regarding the section as a whole, the disease was of minor significance since it was not observed in any other of the fields surveyed. It was reported to the writer, however, that traces were noted in several other fields. It is not surprising, with the large concentration of bean acreage in the area, that some blight would be found since some of the seed used there for planting was probably of eastern or mid-western origin and diseased seed could be brought into the territory in this manner. No common blight (Xanthomonas phaseoli) was found.

Anthracnose and rust. These diseases were not observed in any of the plantings examined.

Root rots. The root rots caused by Rhizoctonia and Fusarium solani f. phaseoli appeared to be more widespread and to be causing more damage than in former years. The month of June was cold and wet, furnishing conditions ideal for the development of these soil-borne parasites. In the vicinity of Twin Falls and Jerome the departure from the normal in temperature was -4.7° and -5.5° F respectively, and for precipitation was +3.04 and +1.92 inches, respectively. July also was a cool month with a departure from the normal in temperature of -4.1° for Twin Falls and -3.0° for Jerome. In early July, when these sections were first visited, most of the crops were growing very slowly and many, especially the Great Northern types, had to be replanted because of poor germination. The root rot damage appeared to be more severe in the early-planted beans of the white-seeded types which failed to germinate before the long cool and rainy spell, than in the case of those that germinated before the rain.

In addition it was noted that many of the crops were planted on land that had grown beans in previous years, and in one case as many as seven successive bean crops had been grown on the same piece of land. In this field a very high percentage of the plants were infected with root rot and although not a high percentage were killed, the plants were stunted with a considerable reduction in yield. Where the crop was grown on land that had grown alfalfa the previous year, or in a reasonably long rotation, the plants were in much better condition and little injury was observed.

Sclerotinia wilt was noted in a number of plantings but it was not causing severe damage to the crops that were examined. Dr. E. C. Blodgett reported (PDR vol. 28, no. 33) severe infections near Kimberly, Declo, Jerome, and Hazelton, Idaho.

Virus Diseases. Common bean mosaic (bean virus 1) was very widespread and caused considerable yield reduction in the Idaho strain of Pinto in the region of Burley. Several fields examined showed almost 100% infection. It was not common in the varieties grown in the Twin Falls and Jerome sections except in a few of the susceptible garden varieties. Pinto beans are not generally grown in this section but mostly the mosaic-resistant Great Northern types.

A condition assumed to be of a virus nature which produces a shininess of the pods, was quite widespread in plantings of those garden-bean varieties that are susceptible to bean virus 1. It is believed that the condition was not caused by yellow bean mosaic, although plants showed a premature yellowing. It does not appear that yields are appreciably reduced even in crops showing a high percentage of the disease.

Only a trace of the "red node" virus was observed. Curly top was of no importance in the fields examined.

DIVISION OF FRUIT AND VEGETABLE CROPS AND DISEASES

POTATO STORAGE DISEASES IN CENTRAL WASHINGTON AND OREGON

Lytton W. Boyle and Earle C. Blodgett

Yakima Valley of Washington. During the survey in this area, January 17 to 18, the writers were accompanied by Dr. J. D. Menzies of the Washington Agricultural Experiment Station.

Production in this area was much less than in 1943, but of better quality on the whole. In general, the efficacy of using the best seed has been impressed on the growers. Very pertinent in this respect, however, seems the lack of concern about rootknot nematode [Heterodera marioni]. Growers and warehouse men did not seem aware of this disease. On the whole, it has as yet apparently caused no large loss, but it was readily evident in 3 of 18 cellars or storage warehouses visited and in 2 cases the infection was rather severe. Unawareness of this disease might lead to its widespread distribution.

The principal varieties grown in this area are Netted Gem and White Rose. Considerable variation occurs between lots of potatoes in respect to amount of loss and type of rot or disease. From the limited number of samples, it is estimated the loss would average from 5 to 10%. Leak (Pythium sp.) is probably the most common type of rot. Black rot (Fusarium sp.) is perhaps next in importance. Jelly-end rot was also noted to be quite prevalent. Net necrosis (virus) was common but to a much less degree than noted in this area last year (1943 crop). Bacterial ringrot [Corynebacterium sepedonicum] was not noted in any of the storages at this time, but was very noticeable in certain cull piles and storage of culls to be used for feeding animals and had evidently caused some severe losses in the area. As mentioned above, rootknot nematodes were also noted in certain lots.

Other troubles noted were Rhizoctonia and scab [Actinomyces scabies] in variable amounts. In so far as could be determined by the tubers, these diseases are fairly well controlled. No cases of severe Rhizoctonia infection were noted, and in only one case was scab noted to be from moderate to severe. Specimens of a very wet type of rot were collected for further study. Dry rot (Fusarium spp.) was noted in minor amounts in some lots. Second growth, growth cracks, feather (immature skin at digging), scald, sun greening, and cuts were noted in variable amounts.

Selah, Ellensburg, Moses Lake, Washington, January 19-20. At Selah, the storage of a large processing plant was observed. It is the practice to wash and dry the tubers received at this storage. Subsequent storage losses are claimed not to exceed 2%. Silver scurf [Spondylocladium atrovirens] appeared to be more common on the washed tubers than was evident in the usual storage. The remarks above applying to Yakima area, will apply in Kittitas County with the exception that no rootknot nematode was observed and that the black rot was equally as prevalent as leak in this area.

Few potatoes were left in the area of Moses Lake for observation. Traces of leak, black rot, ringrot, wet rot, frost rot, net necrosis (virus), sun greening, growth cracks, and cuts were noted. Feather, due to the immaturity at digging, was also prevalent. A very marked comparison was noted in this relatively new area, between the crop from certified seed and ordinary field run.

After listening to the experience of certain growers, the following questions seem pertinent: Are rough handling that would cause internal bruising of the tissues (PDR 28:235), and storage at improper temperatures factors that tend to reduce the stand obtained from seed pieces?

Deschutes area of Oregon, January 15-16. It is estimated that production in this area will reach about 40,000 tons, based on comments of growers and shippers. On the whole, losses in storage were small, although producers' comments indicated that some larger losses had occurred earlier in the season in potatoes that were dug during a period of unseasonably warm weather at the start of harvest. It has been the experience of growers in this area that it is better to take the chance of digging during warm periods late in the season, than to wait. Greater losses are more common because of frost when harvest is delayed.

Leak was the most prevalent type of storage rot (Specimens were collected to verify identity of causal agent). The amount of leak is correlated with the time of digging and condition of storage. Any circumstance that allows relatively warm storage accentuates the rot. Forced ventilation appears to be of significant help in reducing loss due to this trouble. Black rot (Fusarium), a solid type of rot, occurred only in traces in some lots. In a locality west of Redmond, a dry type of rot similar to that caused by Fusarium [solani f.] eumartii was prevalent. Rhizoctonia and scab were evident but noted in moderate to severe proportions in only 2 cases. The relative merits of various methods for control of Rhizoctonia was a pertinent question in the minds of the growers.

Other conditions noted were rot and net necrosis due to frost in some cellars. Silver scurf also was evident on tubers in some lots. Feather (immature skin at digging), scald, sun greening, growth cracks, and second growth also occurred in variable amounts over the area.

EMERGENCY PLANT DISEASE PREVENTION PROJECT.

STORAGE DISEASES OF SWEETPOTATO

Reports are of Emergency Plant Disease Prevention Project surveys.

SUPPLEMENTARY REPORT ON SWEETPOTATO STORAGE IN DELAWARE AND MARYLAND: Return visits have been made to those storage-houses in which "close" ventilation, affording maximum humidity, had been practiced during the curing period. In each locality other houses were inspected, in which considerable aeration had been provided during curing. The data secured on both the first visit and the return visit are presented below. The variety in all cases is Maryland Golden.

The best comparison is afforded by houses 1a and 1b at Millersville, Maryland. Actually these are 2 rooms, upper and lower, in the same house. The upper room (as mentioned in the previous report) was carefully insulated and kept closed during the curing period. The potatoes in the 2 rooms were from the same farm, but to some extent from different fields, the lower room containing some lots that had shown more black rot at harvest time.

Location of storage		Close ventilation practiced	Percentage of disease			Date of visit
			Soft Rot	Black rot	Surface rot	
Delmar, Del.	#1	+	5	0-1	1	Dec. 8, 1944
	#1	+	5	5	2	Jan. 8, 1945
	#2	-	15	5	3-5	Jan. 8, 1945
Salisbury, Md.	#1	+	10	1-2	7	Dec. 1944
	#1	+	8	3.5	5	Jan. 9, 1945
	#2	-	10	5-10	5	Jan. 9, 1945
	#3	-	15	5	3-5	Jan. 9, 1945
Millersville, Md.	#1a	+	tr	tr	tr	Dec. 12, 1944
	#1a	+	1-2	0	0	Jan. 23, 1945
	#1b	-	1-2	5	tr	Dec. 1944
	#1b	-	10	2.5	3	Jan. 23, 1945
	#2	+	2	0	0	Dec. 12, 1944
	#2	+	5	0	0	Jan. 23, 1945

These limited observations suggest that "close-storage" is an effective method with Maryland Golden, and may even afford some protection against soft rot (Rhizopus spp.). One small lot of Nancy Hall was stored in house #2, at Millersville, Maryland. Close stacking of the baskets prevented adequate sampling but considerable amounts of soft rot, black rot (Ceratostomella [Endoconidiophora] fimbriata) and surface rot (Fusarium oxysporum) were seen. -- A. J. Mix, report for 2 weeks ending Jan. 27.

ALABAMA: A survey was made of sweet potato storage rots in Cullman County, Alabama during the week of January 22. The 1944 crop, now being marketed, was one of the largest on record for the county and immediate section. About 2 1/2 million bushels were harvested and about 1 3/4 million bushels were stored. The facilities of a sweetpotato processing plant and the Farmers' Cooperative Market afforded an excellent opportunity for making the survey.

It was learned that losses from Rots were greater than usual. Two explanations were offered for the increased percentages in Rots: (1) Excessive rains during the latter part of the growing season caused the potatoes to be too sappy at digging time, thus rendering them more susceptible to Rots. (2) Poor or rough handling as a result of the labor shortage.

The processing plant referred to above has used thus far approximately 300,000 bushels of potatoes. The procedure of handling the potatoes is as follows: First, "house run" (ungraded) potatoes are placed on a conveyor from which all completely rotted potatoes are removed (10 to 12%). The potatoes then pass through a brushing machine and are dumped onto a second conveyor. Here the U. S. No. 1 potatoes are removed and packed for the "fresh market" (about 20%). The remaining potatoes (about 70%) go to the dehydrating plant or the canning plant. Of the potatoes that went to the processing plants, 10 to 15% were found to be partially rotted. Since the

greater part of the partially rotted potatoes is salvaged, the total loss from storage diseases is about 15%. Where only the fresh market is used, the loss is near 20%.

The Rots in order of their prevalence (Black Rot not included) were: (1) Soft Rot (Rhizopus spp.), (2) Surface Rot (Fusarium oxysporum), (3) End Rot (probably Fusarium spp.), and (4) Java Black Rot (Diplodia tubericola).

Black Rot [Endocondiophora fimbriata] is always a serious disease in this area and is fairly successfully controlled by the majority of the growers. An occasional crop was found where Black Rot had developed. One small grower reported that he salvaged only 5 bushels of marketable potatoes out of a total of 120 bushels because of Black Rot. An inspection of his "cull pile" substantiated his diagnosis. -- G. M. Stone.

DISEASES OF VEGETABLES IN GREENHOUSES AND COLDFRAMES

Reports are of Emergency Plant Disease Prevention Project surveys.

NEW JERSEY: In the week of January 1 to 6 a preliminary trip was made to Northern New Jersey (Essex, Passaic, and Bergen Counties) in company with Dr. C. M. Haenseler, Mr. C. H. Nissley, Extension Horticulturist of the New Jersey Experiment Station, and with the County Agricultural Agent of the respective counties. Calls were made on 20 vegetable growers; 18 grow winter vegetables under sash and 2 in greenhouses. It is planned to visit each of these growers regularly at 2-week intervals. On this first trip the only diseases observed were a small amount of drop (Sclerotinia sclerotiorum) and of seedling damping-off (Pythium or Rhizoctonia?) on LETTUCE.

Farms visited on the second trip, January 17 to 19, were those on which plants are grown under sash. Plants were well up, but small, 3 or 4 weeks from planting.

Damping-off (Rhizoctonia sp.) was found in small amount in LETTUCE (Romaine, Boston, and Iceberg) on 5 farms, and causing serious loss at one farm. Many growers in the area treat their soil with "tear-gas", but on only one of the farms where damping-off occurred had this been done. A peculiar type of injury (apparently due to Pythium sp.) was causing moderate loss on one farm. The main root was either rotted off or browned throughout its length, and had been replaced by a cluster of lateral roots, apparently healthy but in some cases showing browned ends. The fungus was present in the cortex of affected roots, the stele so far as observed being free from invasion, and in some cases the distal portion of the root was decorticated.

Damping-off (Rhizoctonia sp.) of CAULIFLOWER was found at one farm; LETTUCE drop (Sclerotinia sclerotiorum), causing moderate loss, at 2; drop of CAULIFLOWER (Sclerotinia minor) at one; and downy mildew (Peronospora parasitica) of CAULIFLOWER at another.

Disease was entirely absent on 2 farms where the soil had been steam-sterilized. -- A. J. Mix

INDIANA: Southwestern Indiana greenhouses growing vegetables or ornamentals were inspected by Dr. C. T. Gregory, Purdue extension pathologist, and the writer during the week ending February 10th. In a number of these,

for the most part in the Evansville area, lettuce (Grand Rapids variety, Washington strain) was the principal crop. One large house at Terre Haute grew only tomatoes (Pritchard variety). Several houses devoted to lettuce or ornamentals had tomatoes started either for a second crop to follow lettuce or for the Victory and home garden trade. Marglobe, Rutgers, and Long Calyx were among the varieties being grown for these spring greenhouse crops. Bonny Best was the predominant early variety for outdoor planting and Rutgers and Marglobe for the main crop.

LETTUCE - The most prevalent and serious trouble encountered was the virus disease described by R. W. Samson in PDR 28 (6): 203, March 15, 1944. The diseased plants were slightly to severely stunted with varying amounts of necrotic tissue generally present. Since Dr. Samson's work showing aphids to be the vector of this disease, control has centered on fumigation to keep down or eliminate entirely these insects. In establishments where lettuce was the major crop, prevalence of plants with this virus disease was estimated at a trace in 3 houses, 0.5% in one house, 10% in another, and common in a sixth house. In the house with 10% prevalence, fumigation was not regularly practised and aphids were present. In those with a trace and 0.5% prevalence, aphids were not found in the greenhouse on superficial examination, yet when diseased plants from one of these places were examined leaf by leaf under strong artificial light with a hand lens, dead aphids were found on 2 plants out of 5. As Dr. Gregory pointed out to the growers, constant vigilance had to be maintained and regular fumigation practised if this disease was to be kept at a minimum. Dr. Gregory reports that this virus disease occurs in 95% of Indiana greenhouses growing lettuce and that the prevalence of infected plants in some is quite high.

Gray mold of LETTUCE caused by Botrytis sp. was observed as a trace to 2% in all houses. At one grower's place at Freelandville the disease was common in the seedbed causing some loss. Apparently, seedlings already diseased had been transplanted into permanent beds where they later succumbed. Drop (Sclerotinia sclerotiorum) was observed only in 2 houses, as a trace in one and causing 1% loss in another. Mosaic (virus) and tip burn (physiological), although present, were causing little or no harm. Excess soluble salts were making for uneveness of growth and stunting in one house.

TOMATOES - At Terre Haute, plants of the Pritchard variety showed mild symptoms of mosaic (virus). An occasional plant (trace) was dead from wilt (Fusarium oxysporum f. lycopersici). Leaf mold (Cladosporium fulvum) was 100% prevalent but the severity was light and little loss was expected, most of the crop already having been harvested. Seedling plants in all greenhouses were apparently free of disease. -- J. S. Tidd

SPINACH DISEASES IN TEXAS

George E. Altstatt

Surveys were made in the San Antonio, Winter Garden, Lower Rio Grande Valley, and Coastal Bend areas during December.

Aster yellows (virus) was seen in spinach grown in the vicinity of San Antonio, Robstown, Uvalde, and Eagle Pass. Generally, only trace infection was present, except in the Uvalde region where infection in a few fields was from 5 to 8%.

White rust (Albugo occidentalis) was present in the fields near Uvalde, in one case white rust infection had become severe enough to stop the harvest. In the Crystal City -- Carrizo Springs area, the infection was generally light (Dec. 10-14) although some infection of very small plants was noted. In the Eagle Pass area, no white rust infection was observed (December 11). Spinach in the Lower Rio Grande Valley was free from white rust except for a few fields just north of Combs, where the mold was beginning to spread. (Dec. 22). This spinach was large enough to harvest, and after the farmer had been informed of the prevalence of this disease and blue mold (P. effusa), harvest was begun immediately to avoid further loss. In the Coastal Bend area, white rust was found present in many fields. Infection in these fields was of recent origin, and with one or two exceptions damage was slight (December 27-28). A few scattered fields were apparently free from white rust, but with the wet and cool weather which prevailed during the week ending December 30, the infection was very likely to become widespread. In the vicinity of Mathis, the disease was more general, and had progressed further.

Blue mold [downy mildew] (Peronospora effusa) was active in fields of very young spinach and occasionally in older spinach in the vicinity of Crystal City and Uvalde, December 10-14. The fields near Eagle Pass in which heavy infection was seen in November (PDR, Dec. 1, p. 1154) had been harvested, and plants remaining had numerous old lesions on their leaves, but no new growth was observed.

In the Lower Rio Grande Valley, the same fields north of Combs in which white rust was prevalent, also had blue mold. Blue mold was becoming serious in fields east of Raymondville (Dec. 26). Blue mold was just beginning to show in many fields in the Coastal Bend (Dec. 26-28) and weather conditions during the week ending December 30 were favorable for its increase and spread.

Fusarium wilt (Fusarium sp.) was seen in trace amounts north of Combs.

During the first half of January, a survey of vegetable diseases was made in the Houston-Galveston area and westward through the Coastal Bend in company with Dr. R. K. Fletcher, entomologist of the Texas Agricultural Experiment Station.

No white rust was observed on spinach at Sugarland and Alta Loma, but in the Coastal Bend, no fields were free from it. Blue mold in the Coastal Bend was more or less static, but in many fields the older leaves showed numerous lesions due to earlier infection. In several fields, plants were so badly damaged by white rust and blue mold that no harvest would be made.

In the vicinity of Sugarland white grubs had caused slight damage, and in some fields in the Coastal Bend white grub damage was severe. Spinach bud worm infestation was heavy in the vicinity of Edroy, San Patricio County, where damage was severe in several fields.

EMERGENCY PLANT DISEASE PREVENTION PROJECT.

VEGETABLE DISEASES IN WINTER TRUCK CROP AREAS

Reports are of the Emergency Plant Disease Prevention Project surveys.

CARROT DISEASES IN SOUTHERN TEXAS: Surveys were made during December in the San Antonio, Winter Garden, Lower Rio Grande, and Coastal Bend areas.

Aster yellows (virus) infection has not been so severe nor so extensive in carrots this season as it was last season. Heavy infection was noted in 3 fields near San Antonio, where damage will run as high as 75% of the crop. Counts made (Dec. 14) in one field near Catarina showed that 50 to 55% of the plants had unmistakable symptoms of infection, and that the damage would probably exceed 50 percent of the crop. Carrots planted on this field last season suffered heavy damage from aster yellows.

In the Lower Rio Grande Valley, aster yellows was seen only in the area north of Mission. One large field showed a 10% infection, other fields trace amounts (Dec. 17-24).

Leaf spot (Macrosporium carotae) [Alternaria dauci] infection was quite variable. In the Lower Valley, some fields were free from this disease, while a few, particularly near San Juan, had infection heavy enough to be damaging (Dec. 17-24). -- George E. Altstatt

CELERY DISEASES IN CALIFORNIA: In Monterey County, celery was practically free from disease when observed in November. In one field near Salinas a moderate amount of Late Blight (Septoria apii) was present.

East of Santa Clara, Santa Clara County, virus diseases were noted on the Utah variety, including 5% of Western Celery Mosaic in one field, 1% of Spotted Wilt in one field, and 3% of Aster Yellows in one field.

Up to 100% Western Celery Mosaic occurred in some fields of celery and celeriac in Alameda County at Bay Farms Island, Late Blight was severe in some plantings, and about 5% Aster Yellows was noted. -- Henry Schneider, Nov. 19-25.

Celery diseases commonly encountered in Santa Clara County during the week ending December 23 were the virus diseases Aster Yellows and Western Celery Mosaic, and Late Blight. Trace amounts of Pink Rot (Sclerotinia sclerotiorum) and an Undetermined malady possibly of virus nature were observed. -- E. W. Bodine.

DISEASES REPORTED ON CRUCIFEROUS CROPS: Twenty acres of Broccoli examined near Milford, DELAWARE, during November were found to be free from diseases except for a slight amount of Leaf Spot (Alternaria) on the older and lower leaves. -- A. J. Mix

In southern LOUISIANA, Black Leaf Spot (Alternaria sp.) [? A. circinans] was very obvious on Cabbage and Broccoli throughout the vegetable-growing area around New Orleans. Lower leaves were heavily spotted and there was evidence of recent infection on younger leaves. Deficiency symptoms (nitrogen or potassium) were observed on Turnip greens in several fields in this area. (Dec. 26-Jan. 6). A large acreage of mature Cabbage at the Experiment Station at Baton Rouge was heavily infected with Downy Mildew (Peronospora parasitica) and trace amounts of Watery Soft Rot (Sclerotinia sclerotiorum) were noted in the same field. Mosaic (virus) was noted in a field of Mustard at Baton Rouge (Dec. 26-Jan. 6). Downy Mildew was generally distributed in small amounts on lower leaves of Kale in large plantings near La Place (Dec. 4-16). -- Douglas C. Bain.

In southern TEXAS, Cabbage and related plants were unusually free from diseases in December. North of Mission a trace of Fusarium Yellows (F. [oxysporum f.] conglutinans) was observed, and east of Santa Rosa one field showed 2% loss of plants due to Black Rot (Bacterium campestre) [Xanthomonas campestris]. During the first half of January a survey was made in the Houston-Galveston area and westward through the Coastal Bend.

On Cabbage a trace of Black Rot was noted in one field near Sugarland. Oedema (non-parasitic) was affecting about 25% of the plants in a field 8 miles south of Robstown. A trace of Powdery Mildew (Erysiphe polygoni) was seen near Sugarland. A trace of Alternaria Leaf Spot (A. brassicae) was found on Mustard at Alta Loma. White Rust (Albugo candida) had caused almost total loss of approximately 3 acres of curly leaf mustard north of Robstown. -- George E. Altstatt.

The older leaves of Brussels Sprouts observed during November at Marina Beach, in Monterey County, CALIFORNIA, were spotted and yellow from attack by Ring Spot (Mycosphaerella brassicicola), but the disease was of no economic importance. Plants in occasional areas were being rotted by Cottony Rot (Sclerotinia sclerotiorum). In one Cauliflower field south of San Jose, Santa Clara County, 2% infection by Cauliflower Mosaic (virus) was noted. Cauliflower and Broccoli plantings in Kern County examined in December were apparently free from disease except for rare cases of Cauliflower Mosaic. -- Henry Schneider.

Mosaic was found in small amounts in all plantings of Cabbage and Cauliflower inspected in Santa Clara County, CALIFORNIA, during the third week of December. A slight amount of Black Ring (virus) was observed in a 10-acre planting of Broccoli. Downy Mildew was general in all Crucifer plantings inspected but was present only on the older leaves. -- E.W.Bodine

DISEASES REPORTED ON LETTUCE: In southern TEXAS, during December, Aster Yellows was prevalent on one truck farm near San Antonio, and in a planting near Crystal City. In the former, infection was more than 15%, while the latter field showed trace amounts. Drop (Sclerotinia sclerotiorum) was found in trace amount in one planting at Alta Loma during January. -- George E. Altstatt.

In the Salinas Valley in CALIFORNIA, the lettuce season was about finished in the latter part of November. Frosts and early rains were conducive to Drop and Gray Mold (Botrytis cinerea), which were causing severe damage. November wet weather was favorable to Gray Mold in Alameda County also, and up to 100% of the heads were rotted in some fields. Romaine was less affected. In Kern County Drop affected 3% of the plants observed in one field near Delano, in December. Other plantings observed here appeared to be free from diseases. -- Henry Schneider.

Drop and Gray Mold were commonly encountered in many lettuce fields in the Watsonville district in Santa Cruz County, CALIFORNIA, during the second week in December. -- E. W. Bodine

SHALLOT DISEASES IN LOUISIANA: In La Fourche and Terrebonne Parishes (Nov. 20-Dec. 1) a sizeable acreage of fall shallots is being grown. It is of interest to note that the Pink-Root complex (Phoma terrestris and possibly other organisms) is not so severe or prevalent here as it is in the shallot areas about New Orleans. This coincides with observations during the early part of the year.

Yellow Dwarf (virus) was found in trace amounts in 3 large cuts in the vicinity of New Orleans (Dec. 4-16). This is the first time this disease has been seen in the shallot crop this winter. It was observed on Miller's Strain 1, a large variety which seems to show some degree of tolerance to the pink-root complex.

A condition heretofore not observed in shallot was noted in one large field near Bunkie in south central Louisiana (Jan. 8-20). About 3% of

the plants were yellow with very slender upright leaves, unlike plants affected by yellow dwarf. Roots were abundant but the majority were enlarged, brittle, and somewhat distorted. An occasional normal root showed symptoms of pink root. The diseased plants were somewhat stunted, and could easily be pulled, while healthy plants were pulled with difficulty. -- Douglas C. Bain

REPORTS ON DISEASES OF SPINACH: Below New Orleans in St. Bernard and Plaquemines Parishes, LOUISIANA, an outbreak of Leaf Spot (Heterosporium variabile) is reaching epiphytotic proportions. An estimated 25 acres is already so heavily spotted that growers have given them up as a total loss. Downy Mildew (Peronospora effusa) is present in most fields but so far has caused only slight damage. A root Rot is causing considerable damage in 4 half-acre fields. Yellowing of the leaves, wilting of the plants, and rotting of the tap roots characterizes this condition. The disease appears to be more prevalent in poorly drained sections of fields. Last year, a species of Fusarium was consistently isolated from such diseased material. For the past few weeks the weather has been mild and wet. -- Douglas C. Bain, Dec. 26,-Jan. 6.

A small amount of Downy Mildew was observed in the Mission district near Soledad in Monterey County, CALIFORNIA. -- Henry Schneider, Nov. 19-25.

MISCELLANEOUS VEGETABLES: A small amount of Gray Mold (Botrytis cinerea) was present on young Artichoke buds, near Castroville in Monterey County, California (Henry Schneider, Nov. 19-25). Leaf Spot (Ramularia cynarae) was present in several small artichoke plantings in Santa Clara County, occurring in slight amounts on the older leaves only (E.W. Bodine, week ending Dec. 23).

Early fall rains were contributing to molding in hundreds of acres of Beans still on the ground waiting to be thrashed, in Monterey County, California (Schneider, Nov. 19-25).

A trace of Leaf Spot (Cercospora beticola) was observed in Beet fields below New Orleans, Louisiana (Douglas C. Bain, Dec. 4-16). A trace of Rust (Uromyces betae) was present on Chard at Marina Beach, Monterey County, California (Schneider, Nov. 19-25).

In the vegetable area around New Orleans, Louisiana, some growers complained of severe loss of Eggplant and Pepper seedlings as a result of Damping-off in coldframes. Several thousand eggplant seedlings were a total loss in one large coldframe (Bain, Dec. 26-Jan. 6).

English (Garden) Peas in the Robstown area of Texas showed slight damage from Powdery Mildew (Erysiphe polygoni) (George E. Altstatt, Jan. 1-13).

A moderate amount of Powdery Mildew (Erysiphe cichoracearum) was present on Banana Squash at Carmel Valley in Monterey County, California (Schneider, Nov. 19-25).

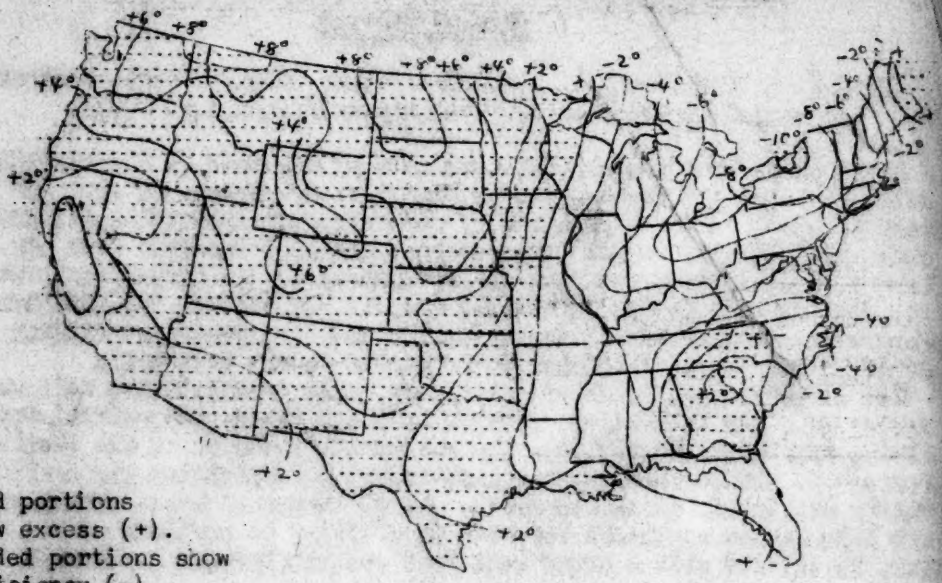
Tomatoes examined before frost (Dec. 7) near Poteet, in the San Antonio region of southern Texas, showed traces of Tip Blight (virus) and Nematode Rootknot (Heterodera marioni) (George E. Altstatt).

JANUARY WEATHER

(From U. S. Department of Commerce Weather Bureau, Weekly Weather and Crop Bulletin for week ending February 6, 1945).

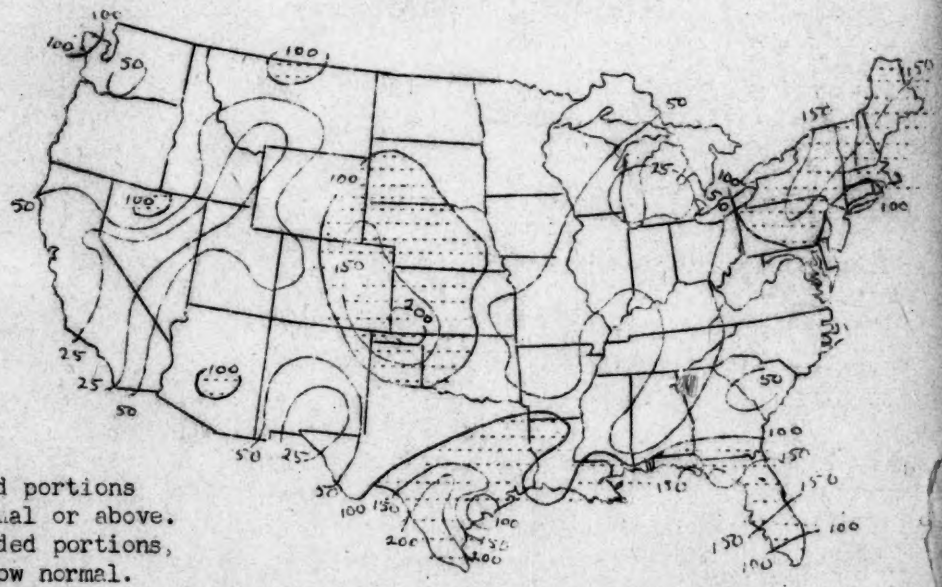
Map I shows that the northeastern part of the country had an extremely cold January, with the departures from normal temperature from -6° to as many as -10° over wide portions of northern Ohio, Pennsylvania, and New York. Slightly subnormal temperatures were also reported from the interior of California and much of the Southeast. In marked contrast to the cold weather in the Northeast, much of the central and northern Great Plains had unusually warm weather, with the plus departure ranging from 6° to 9° over most districts from northern Kansas northward.

Map II shows that areas of relatively heavy precipitation were concentrated in a few localities, notably southern Texas, the central Great Plains and adjoining regions, the Northeast, and much of the Florida Peninsula. Other than these, above-normal precipitation was confined to widely scattered, localized areas. Large subnormal areas are shown from the Lake region southward over the Ohio Valley to portions of the east Gulf States and over a broad belt from western Montana southwestward to southern California.



Shaded portions show excess (+).
Unshaded portions show deficiency (-).
Lines show amount of excess or deficiency.

Map I. - Departure of mean temperature from the normal for January, 1945.



Shaded portions normal or above.
Unshaded portions, below normal.

Map II. - Percentage of normal precipitation, for January 1945.